

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**



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Order Instituting Rulemaking to Establish
Policies, Processes, and Rules to Ensure
Reliable Electric Service in California in the
Event of an Extreme Weather Event in 2021.

Rulemaking 20-11-003
(Filed November 19, 2020)

OPENING BRIEF OF BLOOM ENERGY CORPORATION

September 20, 2021

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Summary of Recommendations

In response to the Commission's call to action as part of this instant proceeding Bloom

Energy submits the following recommendations for consideration:

- ***Adhere to a technology-neutral approach when adopting a path forward*** Creating a technology-neutral structure that builds on California's extraordinary and praiseworthy use of diverse behind-the-meter ("BTM") resources to help the state contend with energy crises and incents predictable, reliable and cost-effective performance that contributes to achieving all of California's energy system objectives.
- ***Overemphasis on one problem may exacerbate another*** An over focus on solving any one problem or on any one set of tools to solve that problem can itself lead to other problems.
- ***Leverage Private Investment for Public Benefit*** The Commission can further leverage customer investment in BTM resources capable of deploying in time to meet the demands of Summer 2022 or 2023, effectively reducing load while also adding capacity to the system during emergency conditions.
- ***Fuel Cells Represent a Cost-Effective and Rapidly Deployable Solution*** Fuel cells can not only provide rapid contributions to meeting California's urgent net peak capacity needs in time for Summer 2022- they can offer meaningful net benefits to all California energy customers, while emitting virtually none of the harmful criteria pollutants that disproportionately impact disadvantaged communities, and with their ability to upgrade to carbon-free operations present none of the climate "stranded cost" concerns noted in testimony.

OPENING BRIEF OF BLOOM ENERGY CORPORATION

In accordance with Rule 13.12 of the Commission’s Rules of Practice and Procedure and the briefing schedule set forth by Administrative Law Judge Stevens, Bloom Energy Corporation (“Bloom Energy”) respectfully submits this opening brief in the Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Reliable Electric Service in California in the Event of an Extreme Weather Event in 2021 proceeding (the “Extreme Weather Proceeding”).

I. INTRODUCTION

The Commission should be commended for crafting a scoping memo and staff concept paper in response to Governor Newsom’s July 30th, 2021, Emergency Proclamation (the “Emergency Proclamation”), which included the directive to

“free up energy supply to meet demand during extreme heat events and wildfires that are becoming more intense and to expedite deployment of clean energy resources this year and next year.”¹

California and its energy system face severe tests ahead, from extreme weather and other climate issues as well as the costs and complexities of its energy transition. Bloom Energy can contribute highly reliable, resilient and cost-effective solutions to help California not only withstand near-term challenges, but in the process of doing so build a clean, equitable, sustainable and affordable energy system to power its economy for decades to come. No single solution is capable of addressing the

¹ See <https://www.gov.ca.gov/2021/07/30/governor-newsom-signs-emergency-proclamation-to-expedite-clean-energy-projects-and-relieve-demand-on-the-electrical-grid-during-extreme-weather-events-this-summer-as-climate-crisis-threatens-western-s/> (Press Release) and <https://www.gov.ca.gov/wp-content/uploads/2021/07/Energy-Emergency-Proc-7-30-21.pdf> (Proclamation of a State of Emergency)

size, scale and diversity of issues facing California’s energy system in the coming summers, let alone those facing the overall transition. We urge the Commission to respond to urgent, immediate needs in a fashion that better enables the success of its vision for a clean energy future, creating a technology-neutral structure that builds on the extraordinary and praiseworthy use of diverse behind-the-meter (“BTM”) resources by a wide range of Californians to help the state contend with energy crises and incents predictable, reliable and cost-effective performance that contributes to achieving all of California’s energy system objectives.

II. DISCUSSION

This proceeding is appropriately scoped to address the resource shortage problem at hand for next summer, and potentially for the following summer as well. The gap is dauntingly substantial, even though recent analyses from the California Energy Commission (“CEC”) reduced its projected size to 4,350 MW in 2022,² and suggest the gap may be of less concern in 2023, *if* ordered procurement is timely deployed.³ We applaud the Governor’s call to action in the Emergency Proclamation, the Commission’s rapid response in establishing this phase of the Proceeding and its actions in other proceedings, and perhaps most of all, the continued and extraordinary response of California’s residents and businesses alike to help stave off energy system disruptions.

Bloom Energy has been pleased to contribute to these and other efforts, and to lend a hand whenever California has had urgent needs, whether in the August 2020 shortages,⁴ the energy supplies needed for COVID auxiliary medical centers,⁵ or to help in any crisis. In responding to the

² CEC Staff Paper – Revised Stack Analysis pg. 4: Staff Paper on the 2022 Stack Analysis, [TN239635_20210908T135116_Staff Paper - Revised 2022 Summer Supply Stack Analysis.pdf](https://www.cec.state.ca.gov/~/media/cec-website/divisions/news-and-outreach/documents/news-office/key-issues/summer-reliability/final-root-cause-analysis-midaugust-2020-extreme-heat-wave--011321.pdf?sc_lang=en&hash=50B9F24F08CC4FA09852C76F2D67E2B9)

³ See, e.g., Reply Testimony of Michel Peter Florio at pp. 3-4.

⁴ https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/news-and-outreach/documents/news-office/key-issues/summer-reliability/final-root-cause-analysis-midaugust-2020-extreme-heat-wave--011321.pdf?sc_lang=en&hash=50B9F24F08CC4FA09852C76F2D67E2B9 See pg. 4

⁵ <https://microgridknowledge.com/rapid-deploment-microgrids-hospitals-bloom/>

immediate issues, we must harness the incredible efforts and capabilities of all Californians and must also avoid the tunnel vision that in many ways contributed to creating the situation we collectively find ourselves in, taking care to select solutions that contribute as much as possible to the broader health of the overall energy system and both California's and the Commission's policy objectives for it.

A. The Nature of the Problem(s) at Hand

In the long term, California clearly will need far more capacity, especially as increasing sectors of the economy convert to electric power. The short-term problem we face is not of overall capacity, but of capacity and energy to serve at the net peak.⁶ However, as opening and reply testimony note, a myopic focus on the net peak could well shift the problem to other times of day or other circumstances.⁷

Solar, a clean and increasingly inexpensive resource, has supplied an increasing proportion of California's capacity- and as the clean energy transition progresses, the solar fleet, along with the wind fleet, should continue to grow by tens, if not hundreds, of gigawatts.⁸ Solar and wind procurement has been, is and will continue to be a sensible solution to meet Renewables Portfolio Standard ("RPS") needs, and to grow as the primary sources of the clean energy required to meet California's energy needs. It was entirely foreseeable, however, that solar and wind procurement without due consideration of daily and year-round and all-weather reliability needs would lead to the net peak problem now before us, leaving power deficiency issues in summer and early fall evenings, when load requirements remain high. Energy storage, largely in the form of lithium

⁶ See, e.g., Prepared Reply Testimony of Brian D. Theaker on Behalf of Middle River Power LLC ("Theaker Reply Testimony").

⁷ See, e.g., *id.* at p.4.

⁸ See CEC, CPUC & CAISO "2021 SB 100 Joint Agency Report" (Mar. 2021), available at <https://efiling.energy.ca.gov/EFiling/GetFile.aspx?tn=237167&DocumentContentId=70349>

batteries, is an excellent complement to California's overall generation fleet as it comes down in price and its performance capabilities increase. It too can, and should, grow substantially as a key part of California's future energy supply,⁹ and holds particular promise as part of the solution to the net peak problem. Similarly, demand response, particularly with new automated capabilities, can be extremely useful in addressing the net peak and many other needs.

However, as several parties have observed in this Proceeding, an overfocus on solving any one problem can itself lead to other problems.¹⁰ Solar and wind supplies will continue to face disruption as a result of wildfire smoke,¹¹ public safety power shutoff disruptions to transmission, or extended poor weather. Storage, to the extent that it relies on recharging from those resources, may also be unable to meet the exigencies of extreme weather, and as a relatively new technology to be deployed at scale has had recent issues.¹² Demand response, while growing in capabilities and cost-effectiveness, cannot manage extended energy disruptions alone. Just as California cannot afford to focus on a single, limited set of problems, it cannot afford to repeat past mistakes by focusing on a single set of technologies to solve the array of problems it now faces. Reasonable, prudent risk management requires deployment of diverse resources collectively capable of meeting the increasing stresses of our rapidly changing energy environment.

In the face of these uncertainties, California's energy customers, both businesses and residential, will not sit idly by- and have not done so. Californians have come through to aid the stability of the energy system at every turn, reducing load and offering power to the grid, often

⁹ See CEC, CPUC & CAISO "2021 SB 100 Joint Agency Report" (Mar. 2021), available at <https://efiling.energy.ca.gov/EFiling/GetFile.aspx?tn=237167&DocumentContentId=70349>

¹⁰ See, e.g., Prepared Testimony of Brian Theaker on Behalf of Middle River Power pg. 15

¹¹ See, e.g. U.S. Energy Information Agency, "Today in Energy: Smoke From California Wildfires Decreases Solar Generation in CAISO" (Sept. 30, 2020), available at <https://www.eia.gov/todayinenergy/detail.php?id=45336>

¹² See, e.g., Klump, "Major Calif. Battery Outage Highlights Energy Storage Risks" (E&E News, Sept. 13, 2021)

stepping up to the plate without compensation for the greater good.¹³ On the other hand, evidence is mounting that Californians are turning to their own means of ensuring the reliable energy supplies they need by installing BTM generation. Absent sufficient guidance or incentives to choose other options that would contribute to a more equitable, cost-effective and climate-friendly energy system overall, they are increasingly turning to diesel generation. Opening and reply testimony point to the jaw-dropping, monstrous size that the diesel fleet has grown to become, and to the range of environmental and climate issues associated with it- issues that disproportionately burden disadvantaged communities.¹⁴

Moreover, a recent study from Stanford, Princeton, E3 and several nongovernmental organizations demonstrated that clean, firm power is an essential element to achieving California's transition to a climate-friendly, affordable and reliable energy system.¹⁵ This study found that "'reliably generating the electricity needed in 2045 from solar and wind power would require building the system up to nearly 500 gigawatts"- which it noted represents ~50% of the nation's entire present generating capacity, and would require accelerating renewables deployment to more than 10x the historical peak rate. In the face of these findings, the study concludes that "[t]here may not be enough people, supplies, or land to do this."¹⁶ In contrast, the study found that adding clean firm power to the energy supply can "help keep generation and transmission costs in line with today's, cut the land area needed for utility-scale solar facilities and energy storage by a factor of

¹³ See Prepared Direct Testimony of Allie Detrio on behalf of the Microgrids Resources Coalition ("Detrio Testimony") at p. 9.

¹⁴ See Opening Testimony of Paul Fukumoto on Behalf of Fuelcell Energy, Inc. at p. 3 ("Fukumoto Testimony")

¹⁵ See Long, Baik, Jenkins, Kolster, Chawla, Olson, Cohen, Colvin, Benson, Jackson, Victor, and Hamburg. "Clean Firm Power is the Key to California's Carbon-Free EnergyFuture" (Issues in Science and Technology, Mar, 24, 2021) ("Clean Firm Energy Study") available at [Decarbonizing California's Grid Requires More than Wind and Solar \(issues.org\)](https://www.issues.org/decarbonizing-california-s-grid-requires-more-than-wind-and-solar)

¹⁶ *Id.*

10, and reduce transmission infrastructure needs by a factor of four by 2045."¹⁷ The following table summarizes the study's projections for the value clean, firm resources can provide for California when added to a solar and wind dominant energy mix:¹⁸

Issue		With Clean Firm Power	Without Clean Firm Power
Costs for generation and transmission <i>California transmission and distribution costs are currently about 9 cents/kWh</i>		~9 cents/kWh	~15 cents/kWh
Solar and Wind Capacity <i>Entire US electric generating capacity is about 1,100 GW</i>		25–200 GW	470 GW
New Storage* <i>Largest battery facility now being built is 0.3 GW /1.2 GWh CA expects to have 2 GW battery capacity in 2021</i>	New short-term battery capacity	20–100 GW	160 GW
	New energy storage	100–800 GWh	1,000 GWh
Land Use <i>CA land area is about 164,000 sq miles</i>		625–2,500 square miles	6,250 square miles
Transmission <i>CA currently has about 15 million MW-miles of transmission</i> <i>*Energy storage beyond existing pumped hydro</i>		2–3 million MW-miles	~9 million MW miles

Table 1. Summary of issues related to the need for clean firm power.

The message this study sends could not be more clear. If California wishes to keep rates manageable and the lights on, to make the energy system more equitable and sustainable, and to eliminate climate emissions, it must add clean, firm generation sources to its energy mix. To do otherwise would result in higher rates than necessary¹⁹, inordinate reliance on wind and solar technologies, significantly higher land use impacts and an enormous and likely unsustainable

¹⁷ *Id.*

¹⁸ *Id.*, Table 1.

¹⁹ Rates at \$0.15/kWh instead of \$0.9/kWh

buildout of transmission. This study clearly supports the need for this proceeding in support clean, firm generation resources as part of the solutions brought to bear on immediate concerns as these resources have long term positive benefits for all Californians concerned about rising energy rates, proliferation of transmission lines that despoil the environment and present unacceptable wildfire risks, and land use impacts that can be avoided.

All in all, the evidence is mounting that California can no longer afford to tackle its energy problems one-by-one. This proceeding cannot solve all of these issues by itself, nor should it attempt to do so. Rather, the Commission, in this Proceeding, should focus on technology neutral, performance-based measures that incent technology developers and deployers, as well as investors (including customer investors for BTM resources), to invest in and deploy the resources that the energy system needs to operate under the range of foreseeable crises. The solutions that the Commission adopts to address the immediate problems at hand can and should adopt solutions that contribute towards California's broader and longer-term needs, helping to build a stronger foundation for the reliable, resilient, equitable, sustainable and climate-friendly energy supply California needs and wants.

Fortunately, the array of solutions offered in opening and reply testimony offer reason for hope. Bloom Energy strongly supports the Emergency Capacity Services Tariff proposal offered by the Microgrid Resources Council ("MRC"), which would provide a technology-neutral, performance-based approach to addressing immediate needs that would harness and guide customer investment choices to highly reliable, sustainable and climate-friendly options, thereby reducing rate pressure and advancing progress towards California's and the Commission's overall goals

B. Solutions: The MRC's ECST Proposal

MRC's opening testimony details its ECST proposal,²⁰ which leverages customer investment in BTM resources capable of deploying in time to meet the demands of Summer 2022 or 2023, effectively reducing load while also adding capacity to the system during emergency conditions. The ECST is a bold proposal, designed to meet the aggressive needs and objectives that have been outlined by the Commission to date.

The ECST proposal was crafted in response to a call by the Commission to examine expedited generation and energy storage procurement, including utility-owned and third party generation, and expedited contracting and other processes²¹ It builds on the remarkable history of California's response to the 2020 capacity shortages, in which hundreds of megawatts of benefit were provided to help the energy system avoid disruption (often without any compensation),²² as well as their clear willingness and interest in investing in more reliable future. While most opening and reply testimony warned against undue optimism in deploying in-front-of-the-meter ("IFOM") resources in time to meet 2022 summer needs, the BTM resources and capabilities that the ECST would incent and harvest require much less advance or deployment time that required for IFOM resources. As Southern California Edison observed in another proceeding, distributed energy resources may be the most promising source of new capacity in this critical timeframe.²³

To ensure the certainty of deployment and performance needed for energy system planning, procurement and operations, the ECST provides for timelines, verification and enforcement mechanisms for load reduction and, during emergency conditions, power injection that would

²⁰ See Detrio Testimony, pg. 4

²¹ See Assigned Commissioner's Amended Scoping Ruling and Memo for Phase 2 pg. 4
<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M398/K465/398465770.PDF>

²² See Detrio Testimony at p. 8.

²³ See Reliability Proposal of Southern California Edison Company in Response to the Ruling on Potential Microgrid & Resiliency Solutions for Commission Reliability Action to Address Governor Newsom's July 30, 2021, Proclamation of a State of Emergency," at pg. 3

assure that the ECST and the resources participating in it operate as expected. Using economic signals to enroll capacity for emergency purposes is common practice at the Commission. The ECST would enable participating customers to invest in BTM resources and offer the quantity of capacity that they can afford to make available to assist in emergencies at varying times of the year, to assist the state in meeting broader capacity needs while also continuing to operate their business as they see fit. The ECST would also and provide means to validate performance, enabling a fully-tailored and fully-verified customer-energy system interaction that meets the needs of both, and creates incentives for customer investments that serve both.²⁴ Simply put, we should not force the business community to choose between continuing to operate their enterprise and assisting the state with society's broader energy needs. This structure, as proposed in the ECST, allows for business continuity while adding capacity.

The proposal is technology neutral, rewarding performance rather than prescribing technology, and enabling the deployment of the mix of BTM technologies and services that offer the greatest value to both the participating customer and to the energy system overall. It does so by providing eligibility criteria that assure resources meet stringent reliability and environmental criteria, ensuring that the resources deployed to meet present problems are not only consistent with both present needs, but with long-term energy system needs and policy objectives, consistent with recent Commission precedent.²⁵

The ECST, by leveraging customer investment that aligns with the Commission's standards and objectives, would also serve to reduce rate pressure, providing headroom for load-serving entity investment needed to achieve energy transition goals without customer rate revolt. We note that in

²⁴ See https://www.pge.com/en_US/large-business/save-energy-and-money/energy-management-programs/demand-response-programs/base-ininterruptible/base-ininterruptible.page?WT.mc_id=Vanity_bip

²⁵ See D. 21-07-011 Decision Adopting a Suspension of the Capacity Reservation Component of the Standby Charge for Eligible Microgrid Distributed Technologies

a recent Commission En Banc,²⁶ several Commissioners observed the upward pressure that ratepayers are facing, which underlines the need to take investment costs into consideration when this Proceeding ultimately selects proposals. To incent investment, more is needed than certainty for energy system planning, procurement and operations; customers must have reasonable certainty that their investments will meet their economic expectations²⁷. For this reason, MRC proposes that customers electing the ECST tariff while this critical capacity shortage continues could remain on the tariff for 25 years, a reasonable period of stability in which they could expect to recoup their investment. Unfortunately, this was misconstrued as the window for eligibility to access the tariff,²⁸ rather than the duration of time that the customer could remain on the tariff if it elected to participate. It is our understanding that participating in the ECST would be purely elective for those customers wishing to make the necessary investments and commitments necessary, and we agree with Southern California Edison that this should be the case.²⁹ We also agree that safety, with respect to BTM resources injecting power to the grid, is of paramount importance; we are not aware of any safety issues or incidents associated with the BTM power injections that were reported in Summer 2020, and appreciate MRC's attention to detail in recommending enhancements to the Investor-Owned Utilities' interconnection staff and advanced assurance that the ECST's proposed quantities of injected energy if called upon under emergency conditions would be consistent with appropriate safety parameters.

²⁶ May 2021 En Banc White Paper noting that a steady growth in customer rates between 2020 and 2030 is forecasted; ranging from 3.5 percent to 4.7 percent: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/reports/2021/senate-bill-695-report-2021-and-en-banc-whitepaper_final_04302021.pdf

²⁷ See e.g., Prepared Reply Testimony of Joel Yu on Behalf of Enchanted Rock, LLC, at pp 2-3.

²⁸ See Prepared Phase 2 Reply Testimony of San Diego Gas & Electric Company Regarding Proposals for Increasing Supply During Peak and Net Peak Demand Hours Through Addition of Utility-Owned Resources at p. 9.

²⁹ See Reply Testimony of Southern California Edison Company-Phase 2 at pp, 7-8

C. Fuel Cells: A Cost-Effective, Rapidly-Deployable and Highly-Resilient Solution to Meet Current & Future Reliability, Environmental and Climate Needs

With their exceptionally high reliability and resilience, offering power through net peak shortages and extended grid disruptions,³⁰ fuel cells offer a valuable, cost-effective³¹ contribution towards solving the energy system challenges specifically at issue in this Proceeding. Like other BTM resources, fuel cells can be deployed quickly, well in advance of Summer 2022. For example, in response to urgent field hospital needs during the first of the COVID-19 surges, Bloom Energy was able to deploy two 400kw systems extremely rapidly- one installment was deployed just three days.³² As a clean, firm resource, fuel cells provide the diversity and stability benefits that can make the energy transition more affordable, reliable, and realistically implementable, with lesser land use and other impacts.³³ Fuel cells, as non-combustion electrochemical generation devices, and can readily meet California Air Resources Board criteria emissions standards, emitting virtually none of the pollutants harmful to human health when operating using natural gas (and none if using hydrogen as a fuel, an option for the near future when hydrogen fuel becomes more widely available, without the concerns raised in testimony regarding combustion of hydrogen or hydrogen blends)³⁴. In addition to their ability to use biogas now, they are amenable to reducing or eliminating carbon emissions by using hydrogen as a fuel or through carbon capture.³⁵ In summary, they not only are able to help California conquer its near-term energy concerns, but can provide much-needed solutions for the range of other hurdles ahead for attaining a sustainable, affordable

³⁰ Fukumoto Testimony.

³¹ Faruqi, at p. 5.

³² Wood, “Bloom’s Quick Build Microgrids Installed at COVID-19 Field Hospitals in California” (Microgrid Knowledge, Apr. 22, 2020) which is available at <https://microgridknowledge.com/rapid-deploment-microgrids-hospitals-bloom/>

³³ Clean Firm Energy Study at Table 1.

³⁴ Fukumoto Testimony, at p. 8.

³⁵ Id.

and equitable energy future for California.

As Dr. Ahmad Faruqui's testimony explains, fuel cells meeting Bloom's performance characteristics can also provide millions of dollars of annual net benefits to all California customers- not just those customers investing in fuel cells- ranging from \$2.4 million for customers in Pacific Gas & Electric Company's service territory to \$12.7 million for those in San Diego Gas & Electric Company's territory, and peaking at \$34.8 million for those in Southern California Edison's territory.³⁶

Notably, however, Dr. Faruqui's analysis demonstrates that the 312 MW of new fuel cell capacity contributions to the imminent reliability problem he projects- and the net financial benefit that would accrue to all California customers- would not occur without appropriate customer incentives. For the sake of simplicity, Dr. Faruqui modeled a credit equivalent to prevailing standby and departing load charges, and observed a resulting increase in deployment and a net levelized system benefit of \$1 to \$15 per MWh of fuel cell operations.³⁷

MRC's proposed tariff solution, the ECST, would deliver the economic signal needed to prompt this customer investment response, and resultant benefit to all California customers. Neither Dr. Faruqui's modeling, nor as we understand it the structure of the ECST, are intended to suggest a request for a tariff developed through this Proceeding that offers exemptions from either standby or departing load charges.³⁸ Rather, they should be taken as proposing a credit sufficient to incent the investment that returns the projected value in net benefits to California customers.

The MRC's proposed ECST would provide an appropriate avenue to address the concerns at issue in this Proceeding and many others currently before the Commission, as well as, with respect

³⁶ Dr. Faruqui's testimony, at pp. 12-15.

³⁷ Id.

³⁸ Id., at pg. 4

to fuel cells, incent deployment of proven resources that would create a net financial benefit to California customers. Whether the Commission ultimately adopts the ECST, or any of the other potential solutions that have been recommended by parties to this proceeding or that may be developed through its rapid course, we urge that the Commission ensure a viable path to harvesting the benefits fuel cells have to offer California customer and the Commission's ambitions for the energy system.

III. CONCLUSION

Fuel cells can not only provide rapid contributions to meeting California's urgent net peak capacity needs in time for Summer 2022- they can offer meaningful net benefits to all California energy customers, while emitting virtually none of the harmful criteria pollutants that disproportionately impact disadvantaged communities, and with their ability to upgrade to carbon-free operations present none of the climate "stranded cost" concerns noted in testimony. To leverage customer investment in fuel cells and harvest their benefits, customers need both appropriate economic incentives and reasonable assurance of rate stability. The MRC's ECST proposal would offer just such an approach, but whether the Commission adopts the ECST or takes other paths through this Proceeding, we urge the Commission to require technology-neutral, performance-based approaches that enable fuel cells to deliver on their promise.

Bloom Energy looks forward to continued collaboration with interested stakeholders to ensure the state's energy infrastructure can meet our near term capacity needs while also delivering tangible results towards a clean and just energy transition.

DATED: September 20, 2021

Respectfully submitted,

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